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**Dahlia Ireland Limited****(Incorporated in Ireland)****Grannagh, Waterford, Ireland**(72) Inventor(s)  
**Thomas A Barry**(74) Agent and/or Address for Service  
**Marks & Clerk**  
**57-60 Lincoln's Inn Fields, LONDON, WC2A 3LS,**  
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**GB 0703095 A GB 0555789 A EP 0451785 A1**  
**EP 0015725 A1 WO 93/20971 A1**(58) Field of Search  
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**INT CL<sup>6</sup> C09C 1/64**  
**ONLINE DATABASES: WPI, CLAIMS**(54) **Manufacture of paste of aluminium pigment and metal soap**

(57) A process for manufacturing nonleafing aluminium flake pigment comprises:  
introducing aluminium into a ball mill;  
adding a solvent to the mill;  
milling the mixture to form a slurry;  
screening the slurry thus formed to remove larger particles;  
re-milling the larger particles;  
holding the screened slurry in a holding tank;  
filtering the screened slurry to form a filter cake;  
removing the filter cake thus formed from the filter;  
calculating the weight of the blend;  
adding a metal soap to the blend in an amount of from 1% to 3% by weight of the filter cake; and  
packaging the blended paste of nonleafing  
aluminium flake pigment thus formed.  
A milling agent, preferably stearic acid, may be added to the ball mill.

**GB 2 292 744 A**



"A process for manufacturing aluminium pigment"

The invention relates to a process for manufacturing aluminium pigment and in particular to a process for manufacturing non-leafing aluminium flake pigment.

5 Aluminium pigments are widely used in coating compositions to impart a metallic lustre. There are two different types of aluminium flake pigments known as leafing and nonleafing flake pigments. In leafing pigments, the aluminium flakes become arranged in a generally flat orientation at the surface of the coating. In the case of  
10 nonleafing aluminium flakes, the flakes are generally randomly orientated in the coating composition.

In manufacturing, it is essential that leafing and nonleafing aluminium flake pigments are made separately.

15 This invention is directed towards providing an improved process for making aluminium flake pigments and in particular for making nonleafing aluminium flake pigments by modifications to a process which is used for making leafing aluminium flake pigments.

20 According to the invention, there is provided a process for manufacturing nonleafing aluminium flake pigment comprising the steps of:-

introducing aluminium into a ball mill;

adding a solvent to the mill;

milling the mixture to form a slurry;

25 screening the slurry thus formed to remove larger particles;

- re-milling the larger particles;
- holding the screened slurry in a holding tank;
- filtering the screened slurry to form a filter cake;
- 5 removing the filter cake thus formed from the filter;
- determining the weight of the blend;
- adding a metal soap to the blend in an amount of from 1% to 3% by weight of the filter cake; and
- 10 packaging the blended paste of nonleafing aluminium pigment thus formed.

In a particularly preferred embodiment of the invention, the metal soap is added in the form of a dispersion in a solvent.

- 15 In a preferred arrangement, the metal soap is a dispersion of a calcium soap in a solvent.

In one embodiment of the invention, the calcium soap dispersion is added in an amount of approximately 2% by weight of the filter cake.

- 20 In a preferred arrangement, the metal soap is dispersed in white spirit.

In one embodiment of the invention, liquid removed during filtration is collected in a holding tank and the process includes the steps of filtering the liquid, extracting

solvent from the liquid and recycling the extracted solvent.

Typically, the extracted solvent is recycled to the ball mill, preferably via a holding tank.

- 5 Preferably, the waste material from the extraction is incinerated in a boiler for heat recovery.

In one embodiment of the invention, the solvent is extracted by distillation.

In one arrangement, the solvent is white spirit.

- 10 In another arrangement, the solvent is naphtha.

In one embodiment of the invention, the process includes the step of adding a milling agent to the ball mill. The milling agent is typically stearic acid which may be added in an amount of from 2 to 8%, preferably 4 to 6% by weight of the metal.

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In a preferred arrangement, the process includes the step of introducing air into the mixture during milling. Preferably, the air is introduced in the form of compressed air supplied directly to the ball mill.

- 20 The invention also provides a nonleafing aluminium flake pigment whenever prepared by the process of the invention.

The invention will be more clearly understood from the following description thereof, given by way of example only, with reference to the accompanying drawing which is a schematic block diagram of a process for manufacturing nonleafing aluminium flake pigment according to the invention.

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Referring to the drawings, there is illustrated a process for manufacturing nonleafing aluminium flake pigment which comprises the step of introducing aluminium 1 into a ball mill 2. Typically, the aluminium is in the form of a reel of aluminium foil which is cut longitudinally, then opened up and folded over before being cut up into folded sections about a half meter long. Layers of the folded aluminium sections are arranged on a pallet in suitable quantities corresponding to one charge for a ball mill. The layers on the pallet are interspersed with separating sheets. Solvent such as white spirit or naphtha and a milling agent in the form of stearic acid are also added to the ball mill. During the milling process, dry compressed air is introduced into the ball mill continuously to make air available to the mixture during milling. Stearic acid is added in an amount of from 2% to 8%, most preferably 4% to 6% by weight of the metal.

After milling, the slurry thus formed is delivered to a holding tank 6 and passed through a sieve 7 which removes larger particles. The large particles are recycled along line 8 to the ball mill for further milling.

The screened milled material is then delivered to a holding tank 10 prior to filtering under pressure in a filter press 11. The filter cake 12 is collected and passed to a blender 13 while liquid from the filter press 11 is collected in a holding tank 15, passed through a further filter press 16 and the liquid thus produced is subjected to an extraction process, in this case in a distillation column 17 from which distilled solvent is delivered along line 20 for recycling by way of a solvent holding tank 21 to the ball mill 2 for re-use. Waste material from the distillation 17 is delivered to a boiler 25 for incineration and heat recovery.

In the blender 13, the filter cake 12 is blended with a metal soap which is added to the cake in an amount of from 1% to 3%, most preferably approximately 2% by weight of the filter cake. The metal soap is in the form of a dispersion in a solvent, preferably white spirit. The calcium soap dispersion is added in an amount of from 1% to 3%, most preferably approximately 2% by weight of the cake.

The blended paste of nonleafing aluminium flake pigment 30 thus formed is collected in a drum 35. Alternatively, the nonleafing aluminium flake is polished further in a polisher 36 and the polished nonleafing flake paste is packaged into drums 37.

The invention provides an optimised process for producing non-leafing aluminium flake pigment in a highly efficient manner. The same equipment may be used for making leafing and nonleafing paste. The process is similar up to the production of the filter cake. Because of the improved process, it is possible to produce nonleafing aluminium flake pigment without risk of cross contamination with or by leafing aluminium flake when the same equipment is used.

Many variations on the specific embodiment of the invention described will be readily apparent and accordingly the invention is not limited to the embodiments hereinbefore described which may be varied in detail.

**CLAIMS**

1. A process for manufacturing nonleafing aluminium flake pigment comprising the steps of:-

introducing aluminium into a ball mill;

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adding a solvent to the mill;

milling the mixture to form a slurry;

screening the slurry thus formed to remove larger particles;

re-milling the larger particles;

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holding the screened slurry in a holding tank;

filtering the screened slurry to form a filter cake;

removing the filter cake thus formed from the filter;

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calculating the weight of the blend;

adding a metal soap to the blend in an amount of from 1% to 3% by weight of the filter cake; and

packaging the blended paste of nonleafing aluminium flake pigment thus formed.

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2. A process as claimed in claim 1 wherein the metal soap is added in the form of a dispersion in a solvent.



3. A process as claimed in claim 2 wherein the metal soap is a dispersion of a calcium soap in a solvent.
4. A process as claimed in claim 3 wherein the calcium soap dispersion is added in an amount of approximately 2% by weight of the filter cake.
5. A process as claimed in any of claims 2 to 4 wherein the metal soap is dispersed in white spirit.
6. A process as claimed in any preceding claim wherein liquid removed during filtration is collected in a holding tank and the process includes the steps of filtering the liquid, extracting solvent from the liquid and recycling the extracted solvent.
7. A process as claimed in claim 6 wherein the extracted solvent is recycled to the ball mill.
8. A process as claimed in claim 7 wherein the extracted solvent is collected in a solvent holding tank for solvent recycled to the ball mill.
9. A process as claimed in claim 6 or 7 wherein the waste material from the extraction is incinerated in a boiler for heat recovery.
10. A process as claimed in any of claims 6 to 8 wherein the solvent is extracted by distillation.
11. A process as claimed in any preceding claim wherein the solvent is white spirit.
12. A process as claimed in any preceding claim wherein the solvent is naphtha.

13. A process as claimed in any preceding claim including the step of adding a milling agent to the ball mill.
14. A process as claimed in claim 11 wherein the milling agent is stearic acid.
- 5 15. A process as claimed in claim 14 wherein the stearic acid is added in an amount of from 2% to 8% by weight of the metal.
- 10 16. A process as claimed in claim 14 or 15 wherein the stearic acid is added in an amount of from 4% to 6% by weight of the metal.
17. A process as claimed in any preceding claim including the step of introducing air into the mixture during milling.
- 15 18. A process as claimed in claim 17 wherein the air is introduced in the form of compressed air supplied directly to the ball mill.
19. A process substantially as hereinbefore described with reference to the accompanying drawings.
- 20 20. Nonleafing aluminium flake pigment whenever prepared by a process as claimed in any preceding claim.

<b>Patents Act 1977</b> <b>Examiner's report to the Comptroller under Section 17</b> <b>(The Search report)</b>	<b>Application number</b> <b>GB 9416460.5</b>
<b>Relevant Technical Fields</b>  (i) UK Cl (Ed.M)      C4A (ii) Int Cl (Ed.5)      C09C 1/64  <b>Databases (see below)</b> (i) UK Patent Office collections of GB, EP, WO and US patent specifications.  (ii) ONLINE DATABASES: WPI, CLAIMS	<b>Search Examiner</b> <b>C SHERRINGTON</b>
	<b>Date of completion of Search</b> <b>14 NOVEMBER 1994</b>
	<b>Documents considered relevant following a search in respect of Claims :-</b> <b>1-20</b>

**Categories of documents**

<b>X:</b> Document indicating lack of novelty or of inventive step.	<b>P:</b> Document published on or after the declared priority date but before the filing date of the present application.
<b>Y:</b> Document indicating lack of inventive step if combined with one or more other documents of the same category.	<b>E:</b> Patent document published on or after, but with priority date earlier than, the filing date of the present application.
<b>A:</b> Document indicating technological background and/or state of the art.	<b>&amp;:</b> Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	GB 0555789 (REYNOLDS METAL COMPANY) whole document	1
A	GB 0703095 (THE BRITISH ALUMINIUM COMPANY) whole document	1
A	EP 0015725 A1 (ALCAN RESEARCH AND DEVELOPMENT LIMITED) whole document, especially Examples 1 to 6	1, 11-13
A	EP 0451785 A1 (ASAHI KASEI METALS LIMITED) whole document, especially page 5, lines 31 to 43	1, 11-16
A	WO 93/20971 A1 (HAUSKA MIKLOS ET AL) whole document	1, 11-13

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).